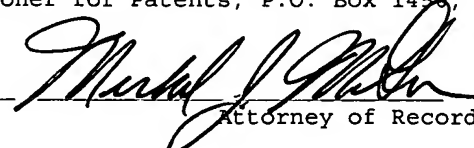


I hereby certify that this correspondence is being deposited with the U.S. Postal Service on the date set forth below as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date of Signature:

and Deposit:

Feb. 10, 2006 
Attorney of Record

PATENT

Docket No. 920976.00005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Hsu
Appl. No.: 10/668,586
Filed: Sep. 23, 2003
For: METHOD AND RADIAL GAP MACHINE
FOR HIGH STRENGTH UNDIFFUSED BRUSHLESS
OPERATION
Art Unit: 2834
Examiner: K. Tamai

Declaration of John S. Hsu

Under 37 C.F.R. 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Dr. John S. Hsu, declare and state as follows:

1. I am the sole inventor is this patent application.
2. I have been granted at least 24 U.S. Patents and at least one UK patent as appears on my curriculum vitae attached hereto. I have also been a frequent contributor to IEEE publications and conferences in the field of motors

and motor control as appears in more detail in my curriculum vitae attached hereto as Exhibit 1.

3. I have reviewed the Office action of November 30, 2005, in which claims 1, 2, 5, 9, 11-15, 17, 18 and 19 were rejected as being anticipated by Rosenberg (US 3,411,027)), or obvious over Rosenberg in view of Koharagi (US 2002004734).

4. I understand that the U.S. Patent and Trademark Office has rejected my patent application because it was said that my claimed invention was shown completely by Rosenberg or that it would be obvious to modify Rosenberg according to the teaching of Koharagi.

5. The Examiner said that it is inherent that the permanent magnets 54 in Rosenberg contain excitation flux entering the pole pieces and inhibit flux leakage from the pole portions 49 and 51 (in Figs. 5 and 6). In his last action, the Examiner further said that the statements of my attorney filed 10/11/2005 have been considered but are not persuasive because in Rosenberg the magnetic flux from the permanent magnet will inherently flow from the south to the north poles and back to the south pole.

6. The Examiner's statements do not show an understanding of the difference between Rosenberg reference and my claimed invention for the following reasons:

a. Rosenberg teaches the weakening or enhancing of flux through a "shunt path" which includes a path through the permanent magnets (hereafter "PMs") (See the arrows in Rosenberg, Figs. 1, 2a and 5 and description at col. 2, lines 38-43 defining the shunt path and col. 6, lines 8-10 relative to Fig. 5);

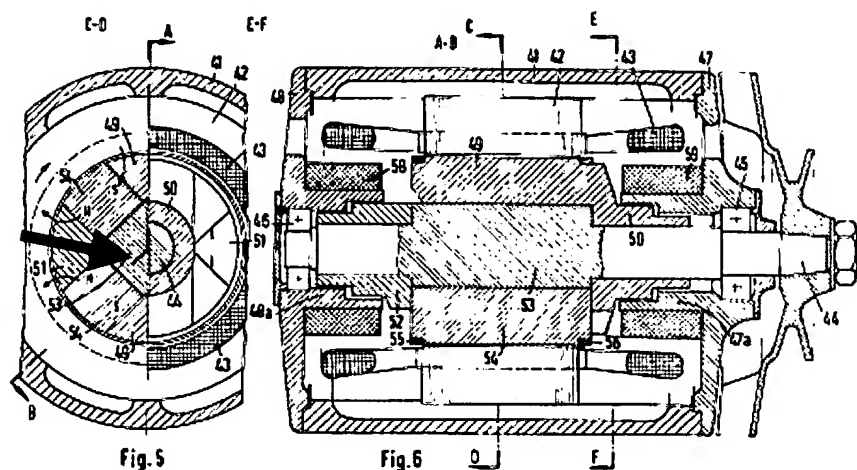
b. In contrast thereto, my claimed invention provides for enhancing of flux in a flux path through

c. In contrast to Rosenberg, in my claimed invention, the PMs act to block or inhibit leakage of flux through the PMs in a flux enhancement mode - Rosenberg does not disclose or teach this;

Figs. 5 and 5a, Hsu, U.S. Appl. No. 10/668,586

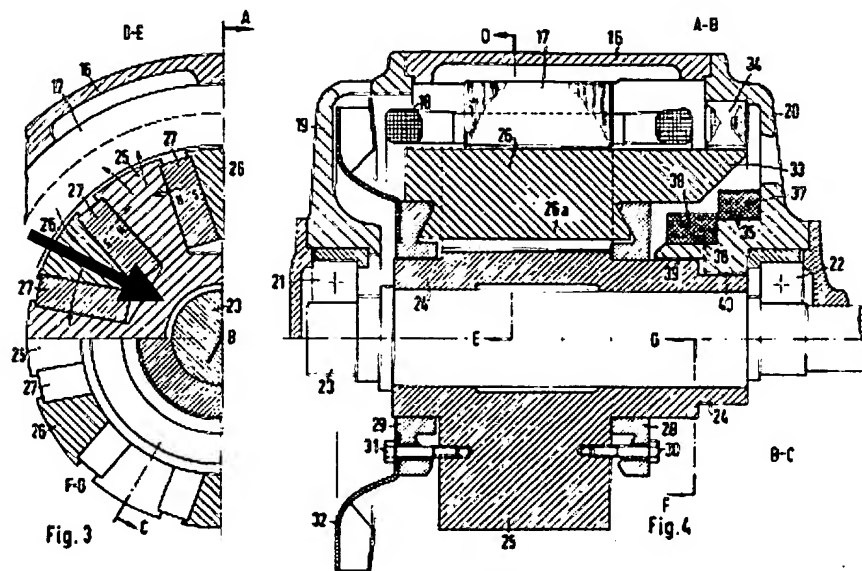
- 3 -

function of my invention as expressed in claims 1 and 13.



Figs. 5 & 6, Rosenberg, U.S. Pat. No. 3,411,027

f. In Fig. 3 and 4 of Rosenberg, seen below, flux is shown as traveling through the PM material from poles 26 to poles 25. Flux would also leak from pole 26 between magnets 27 along a radial path as shown by the heavy black arrow.



Figs. 3 & 4, Rosenberg, U.S. Pat. No. 3,411,027

7. I next address the Examiner's rejection based on Rosenberg combined with Koharagi. In Koharagi, the PMs in

Fig. 4 and 6 are used to separate the poles but their stated purpose is to reduce "q-axis" reactance when the rotor is driven by a sensorless (no position or speed feedback) vector controller. A vector controller is an AC type of control, which in software resolves AC voltage and current into q-axis, d-axis and many other quantities in the controller, but nevertheless directly controls magnitude and frequency of AC quantities and does not directly control DC inputs on a motor. There are no DC coils supplying additional DC flux to add to the AC flux in the motor in Koharagi.

8. Neither Koharagi nor Rosenberg disclose the objective of preventing leakage of DC flux in a PM machine having additional DC excitation. There would be no suggestion to one of ordinary skill in the motor art to achieve the purpose of my invention by consulting these two references and no suggestion for combining their structures to provide the combination of my claimed invention.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: February 6, 2006 John S. Hsu
John S. Hsu, Ph.D.

CURRICULUM VITAE

JOHN S. HSU (f/k/a HTSUI)

CITIZENSHIP: United States

EDUCATION:

Ph.D., Bristol University, England, 1969, Electrical Engineering
B.Sc., Tsing Hua University, China, 1959, Electrical Engineering

POST-DOCTORAL TRAINING:

Bradford University, England, 1969-1971, Power Electronics

PROFESSIONAL EXPERIENCE:

2001-	Distinguished engineer, Digital & Power Electronics, Oak Ridge National Laboratory
1993-2001	Senior staff scientist, Digital & Power Electronics, Oak Ridge National Laboratory
1990-1993	Manager and Researcher, Industrial Drives Program, Center for Electromechanics, The University of Texas at Austin
1986-90	Head, Rotating Machines and Power Electronics Program, Center for Energy Studies, The University of Texas at Austin
1986	Research Engineer, Center for Energy Studies The University of Texas at Austin
1975-86	Senior Research Engineer, Westinghouse Electric Corporation, Heavy Industrial Motors Division and Large Motors Division
1971-75	Engineering Specialist, Emerson Electric Company
1969-71	Post-Doctoral Fellow, Bradford University, England
1968-69	Designer, Newman Industries, England
1964-69	Ph.D. Research Worker, Bristol University, England
1962-64	Electrical Engineer, China Cold Storage & Engineering,

Hong Kong

1959-61

Lecturer, Tien-Tsin Technology University, China

INDUSTRIAL CONTRIBUTIONS:

30 years of industry experience in research, development, design, and production.
Technical innovations for the latest "Westinghouse World Series" heavy industrial induction motors.

ANSI C50.41 (Induction motor section)

Heavy power electronic circuit analytical methods.

Computer programs of synchronous and induction motor designs, transient torque calculations, brushless exciters, design optimizations, and etc currently used by industry.

Patents in power electronics, adjustable speed drives and motors.

AWARDS:

Westinghouse Engineering Award, 1983

Oak Ridge National Laboratory Extramile Award, 1997

Lockheed Martin Energy Research Corporation Certificate of Recognition, 1997

PROFESSIONAL COMMITTEE:

Member of IEEE/PES Induction Machinery Subcommittee, DC Machines Subcommittee.

Member of IEEE/IAS Electric Machines Subcommittee.

PROFESSIONAL REGISTRATION:

Registered Professional Engineer in Texas, Missouri, and New York

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS:

Fellow, Institution of Electrical Engineers.

Senior Member, Institute of Electrical and Electronics Engineers, Inc.

CONSULTING EXPERIENCE:

Westinghouse Electric,
Emerson Electric
ECO Waste Technology

PATENTS:

- “Hybrid-Secondary Uncluttered Permanent Magnet Machine and Method,” US Patent 6,977,454, December 20, 2005.
- “Permanent Magnet Machine and Method with Reluctance Poles for High Strength Undiffused Brushless Operation,” US Patent 6,972,504, December 6, 2005.
- “Cascaded Die Mountings with Spring-Loaded Contact-bond Options,” US Patent 6,930,385, August 16, 2005.
- “Simplified Hybrid-Secondary Uncluttered Machine and Method,” US Patent 6,891,301, May 10, 2005.
- “Electrofriction Method of Manufacturing Squirrel Cage Rotors,” US Patent 6,877,210, April 12, 2005.
- “Utilizing Zero-Sequence Switchings for Reversible Converters,” US Patent 6,831,442, December 14, 2004.
- “Total Thermal Management System for Hybrid and Full Electric Vehicles,” US Patent 6,772,603, August 10, 2004.
- “Motor Stator Using Corner Scraps for Additional Electrical Components,” US Patent 6,707,222, March 16, 2004.
- “Superconducting PM Undiffused Machines with Stationary Superconducting Coils,” US Pat. No. 6,700,297, March 2, 2004.
- “High Strength Undiffused Brushless (HSUB) Machine,” US Pat. No. 6,573,634, June 3, 2003.
- “Hybrid Secondary Uncluttered Induction Machine,” U.S. Patent No. 6,310,417, October 30, 2001.
- “Method of Manufacturing Squirrel Cage Rotors,” U.S. Patent No. 6,088,906, July 18, 2000.
- “Direct Control of Air Gap Flux in Permanent Magnet Machines,” U.S. Patent No. 6,057,622, May 2, 2000.
- “Permanent Magnet Energy Conversion Machine,” U.S. Patent 5,952,756, September 14, 1999.
- “Soft-Commutated Direct Current Motor, U.S. Patent No. 5,929,579, July 27, 1999.
- “Method and Apparatus for Assembling Permanent Magnet Rotors,” U.S. Patent No. 5,914,552, June 22, 1999.
- “Extended Cage Adjustable Speed Electric Motors and Drive Packages,” U. S. Patent No. 5,886,445, March 23, 1999.
- “Homopolar Motor with Dual Rotors,” U.S. Patent No. 5,844,345, December 1, 1998.
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- With H. H. Woodson, “Method and Apparatus for Improving Performance of AC Machines,” US Patent No. 5,189,357, February 23, 1993.

With H. H. Woodson, "Method and Apparatus for Improving Performance of AC Machines," US Patent No. 5,053,689, October 1991.

With H. H. Woodson, "Method and Apparatus for Improving Performance of AC Machines," US Patent No. 5,019,766, May 1991.

"Motor and Control System Having Cyclic Reversal and Undirectional Capabilities," US Patent No. 3,969,658, 1976.

"Dynamoelectric Control System and Motor Therefor," US Patent No. 3,858,098, 1974.

"An Automatic Synchronizer and Phase Regulator for an Alternator with Two-Axis Excitation," UK Patent No. 1,152,263, 1967.

PUBLICATIONS:

G. J. Su, J. S. Hsu, "An Integrated Traction and Compressor Drive System for EV/HEV Applications," Twentieth Annual Applied Power Electronics Conference and Exposition, March 6-10, 2005, Austin Hilton, Austin, Texas.

John S. Hsu, "Flux Guides for Permanent-Magnet Machines," IEEE Transactions on Energy Conversion, June 2001, Vol. 16, No. 2, ITCNE4, (ISSN 0885-8969), pp. 186-191.

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John S. Hsu, "A Machine Approach for Field Weakening of Permanent-Magnet Motors," 2000 Future Car Congress, Paper No. 2000-01-1549, Society of Automotive Engineers, April 2-6, 2000.

John S. Hsu, "Direct Control of Air Gap Flux in Permanent Magnet Machines," IEEE Transactions on Energy Conversions, Paper No. TR7001, 2000.

John S. Hsu, "Soft Commutated Direct-Current Motors," 1998 IEEE Workshop on Power Electronics in Transportation, IEEE Power Electronics Society, October 22-23, 1998, Dearborn, Michigan.

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- John S. Hsu, "Instantaneous Power Factor Determined by Instantaneous Phasors," Invited Paper, 1998 Large Engineering Systems Conference on Electrical & Computer Engineering, PES/IEEE, Halifax, Nova Scotia, Canada, June 7-9, 1998.
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- Hsu (Htsui), John S., Scoggins, Brian P., "Field Test of Motor Efficiency and Load Changes through Air-Gap Torque," *IEEE Transactions on Energy Conversion*, September 1995, Vol. 10, No. 3, ITCNE4 (ISSN 0885-8969), pp. 471-77.
- Hsu (Htsui), John S., Otaduy, Pedro J., Kueck, John D., "Efficiency and Reliability Assessments of Retrofitted High-Efficiency Motors," Conference Record of 1995 IEEE 30th IAS Annual Meeting, October, 1995, Orlando, Florida, pp. 2745-51.
- John S. Hsu, Patrick L. Sorenson, "Field Assessment of Induction Motor Efficiency through Air-Gap Torque," Paper No. 96WM-130-5EC, presented at the IEEE/PES Winter Meeting, January 21-25, 1996, Baltimore,

MD, and accepted for publication in IEEE Transactions on Energy Conversion.

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Hsu, John S., Stein, Jan, "Shaft Signals of Salient-Pole Synchronous Machines for Eccentricity and Shorted-Field-Coil Detections," Presented at IEEE/PES 1994 Winter Meeting, New York, New York, January 30 - February 3 1994, (Paper No. 037-2 EC), IEEE Transactions on Energy Conversion . September 1994, Volume 9, Number 3, ITCNE4, pp. 564-571.

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- John S. Hsu (Htsui), "Field Motor Efficiency Measurement Technique" Presented in the DOE's Tool and Protocol Workshop of Motor Challenge Program, Sept. 22-23, 1994, Chicago, Illinois.
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